



Europäisches Patentamt
European Patent Office
Office européen des brevets



Publication number:

0 445 442 A1

(12)

EUROPEAN PATENT APPLICATION

(21) Application number: 90203521.1

(51) Int. Cl.⁵: B65D 5/00, B65D 5/36

(22) Date of filing: 28.12.90

(30) Priority: 09.03.90 NL 9000553
14.09.90 NL 9002029

(43) Date of publication of application:
11.09.91 Bulletin 91/37

(84) Designated Contracting States:
BE DE GB NL

(71) Applicant: KNP FREE B.V.
H. Westerstraat 20-22
NL-9665 AL Oude Pekela(NL)

(72) Inventor: Prak, Johan
Apollolaan 45
NL-9665 CP Oude Pekela(NL)

(74) Representative: Smulders, Theodorus A.H.J.,
Ir. et al
Vereenigde Octrooibureaux Nieuwe Parklaan
107
NL-2587 BP 's-Gravenhage(NL)

(54) Tray and blank therefor.

(57) A ready-to-use tray which can be set up from a collapsed position, comprising two pairs of support elements (8) each having a support panel (10) adjacent to the wall element, a support fold (11) adjacent to said support panel (10) and an outer support panel (12) adjacent to a support fold. In the collapsed position the outer support panels (12) are each folded back on the side remote from the bottom panel (1), relative to the inner support panels (10) of a corresponding support element (8). Bottom/wall folds (2) are adjacent to wall elements (4) of the second pair of wall elements and each terminate at a distance from the wall element (3) that is greater than the distance from a most proximal wall/support fold (9) to said wall element (3). In an area between each end of the bottom/wall folds (2) and said wall element (3) on the side of that end extends a free edge (26) of the bottom panel (1). In set-up position the support panels (8) each bear on the bottom panel (1) substantially throughout the distance between the wall/support fold (9) and the support fold (11) of said support panels. The ready-to-use tray according to the invention has improved stacking strength.

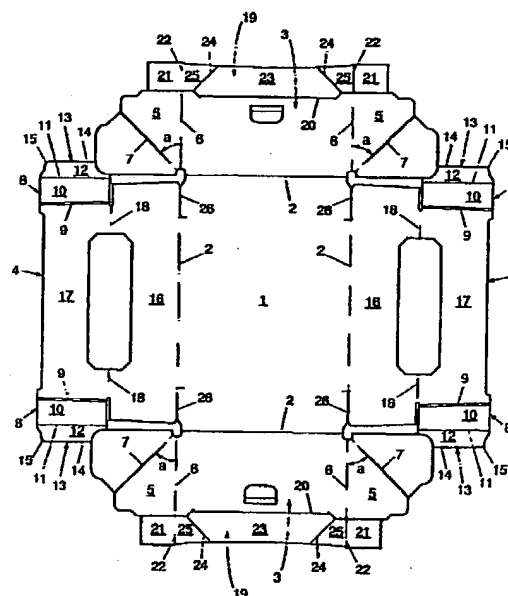


FIG. 5

EP 0 445 442 A1

This invention relates to a ready-to-use tray that can be or has been set up from a collapsed position, comprising a bottom panel, a first and a second pair of oppositely disposed wall elements adjacent to said bottom panel along bottom/wall folds, two pairs of connection panels which are each adjacent to a wall element of said first pair of wall elements along a wall/connection fold, hingedly connected to a wall element of said second pair of wall elements along a set-up fold, the wall/connection fold extending transverse of the bottom/wall fold adjacent to the respective wall element, the set-up fold extending obliquely relative to said folds and the produced part of each of the set-up folds substantially intersecting a most proximal point of intersection of said bottom/wall folds, and two pairs of support elements each adjacent to a wall element of said second pair of wall elements along a wall/support fold, the wall/support fold extending transverse of the bottom/wall fold adjacent to the respective wall element, each support element comprising an inner support panel adjacent to the wall element, a support fold adjacent to said inner support panel and an outer support panel adjacent to a support fold, the outer support panels each having a free edge opposite the support fold, which edge extends towards the support fold at a distance from the bottom panel, the outer support panels in the collapsed position, on the side remote from the bottom panel, being folded back relative to the inner support panels of a corresponding support element, a portion of the outer support panel being disposed between the connection panel and a wall element of the first pair of wall elements, and the outer support panels, in the set-up position, each extending substantially transverse of the inner support panel of a corresponding support element.

Such a tray is known from DE-U-8610403. In this known tray the support panels are provided with an arresting nose resting on the bottom panel in set-up position. In the known tray, in the set-up position, the support panel keeps oppositely disposed wall elements of the second pair of wall elements apart, which facilitates stacking such boxes.

However, a drawback of such known trays is that the stacking strength is limited, in particular when they are employed as trays for vegetables which are stored in cold stores with a high humidity. This problem presents itself in particular when the contents of the trays are not suitable for supporting, at least partly, the trays stacked thereon. This is an important reason why for packing vegetables, such as tomatoes, wooden boxes are used provided with stiffening uprights at the corners.

It is an object of the invention to provide a ready-to-use tray having a great stacking strength,

which, like the known tray, can readily be set up.

According to the invention, this object is accomplished by providing a tray of the type described hereinabove, characterized in that the bottom/wall folds adjacent to the wall elements of the second pair of wall elements each terminate at a distance from a wall element of the first pair of wall elements, that is greater than the distance from the most proximal wall/support fold to said wall element, that a free edge of the bottom panel extends in an area between each end of the bottom/wall folds and the wall element of the first pair of wall elements on the side of that end, and that, in set-up position, the support panels each bear on the bottom panel substantially over the entire distance between the wall/support fold and the support fold of said support panels.

In the ready-to-use tray according to the invention, the wall elements of the second pair of wall elements are each separated from the bottom panel in the area of the support panels. This makes it possible for each of the inner support panels to be constructed of a height such that in the set-up position it will bear on the bottom panel over the entire distance between the wall/support fold and the support fold of the inner support panels without thus preventing the tray from being collapsed due to its abutting the bottom/wall fold. By virtue of the fact that in the set-up position of the tray, each of the inner support panels is thus enabled to rest on the bottom panel throughout its width, a tray is obtained with strongly improved stacking strength.

Surprisingly, a tray with increased stacking strength can be obtained by separating from each other the bottom panel and the wall elements of the second pair of wall elements in the area of the support panels.

The invention may further be embodied in a blank for forming a ready-to-use tray according to the invention, formed from at least one sheet comprising a bottom panel, a first and a second pair of oppositely disposed wall elements adjacent to the bottom panel along bottom/wall folds, two pairs of connection panels each adjacent to a set-up fold, wherein wall/connection folds extend transverse of the bottom/wall folds adjacent to the respective wall element, the set-up folds extend obliquely relative to said folds, and two pairs of support elements each adjacent to a wall element of the second pair of wall elements along a wall/support fold, which wall/support fold extends transverse of the bottom/wall fold adjacent to the respective wall element, wherein each support element comprises an inner support panel adjacent to the wall element and an outer support panel adjacent to said support panel along a support fold, and the outer support panels have free edges opposite the support fold, of which at least a terminal portion ex-

tends towards the support fold.

According to the invention, in a blank of the type described hereinabove, the bottom/wall folds adjacent to the wall elements of the second pair of wall elements each terminate at a distance from a wall element of the first pair of wall elements, that is greater than the distance from the most proximal wall/support fold to said wall element or to a produced part of the bottom/wall fold adjacent to that wall element, and a free edge of the bottom panel extends in an area between each end of the bottom/wall folds and the wall element of the first pair of wall elements on the side of that end.

The invention will now be further explained and illustrated with reference to a number of embodiments, referring to the accompanying drawings, in which:

Fig. 1 is a perspective view of a tray according to the invention in set-up position;

Fig. 2 is a cross-sectional top plan view taken on the line II-II of Fig. 1 of a corner portion of the tray;

Fig. 3 is a diagrammatic side elevational view of a corner portion of the tray according to Fig. 1, in collapsed position;

Fig. 4 is a diagrammatic cross-sectional side elevational view of the corner portion of Fig. 3;

Fig. 5 is a pattern of a blank for forming the tray according to Fig. 1;

Fig. 6 is a pattern of a second blank for forming a tray according to the invention;

Fig. 7 is a pattern of a third blank for forming a tray according to the invention;

Fig. 8 is an elevational view according to Fig. 2 of a ready-to-use tray formed from a blank according to Fig. 6; and

Fig. 9 is an elevational view according to Fig. 2 of a ready-to-use tray formed from a blank according to Fig. 7.

A first embodiment of the ready-to-use tray according to the invention is shown in collapsed position in Figs. 3 and 4, and in set-up position in Figs. 1 and 2.

The tray comprises a bottom panel 1 with a first and a second pair of oppositely disposed wall elements 3 and 4 adjacent thereto along bottom/wall folds 2, and two pairs of connection panels 5 each adjacent to a wall element 3 of the first pair of wall elements along a wall/connection fold 6. The connection panels 5 are each hingedly connected to a wall element 4 of the second pair of wall elements along a set-up fold 7. The wall/connection folds 6 extend transverse of the bottom/wall fold 2 adjacent to the respective wall element 3, the set-up folds 7 each extend obliquely relative to said folds 2 and 6 and the produced part of each of the set-up folds 7 substantially intersects a most proximal point of intersection of the

bottom/wall folds 2. Two pairs of support elements 8 are each adjacent to a wall element 4 of the second pair of wall elements along a wall/support fold 9, each wall/support fold 9 extends transverse of the bottom/wall fold 2 adjacent to the respective wall element 4. Each of the support elements 8 comprises an inner support panel 10 adjacent to the wall element 4 and an outer support panel 12 adjacent thereto along a support fold 11. The outer support panel 12 has a free edge 13 opposite the support fold 9, of which (see Fig. 5) a portion 14, for example, extends parallel to the support fold 11 and a portion 15 on the side of the bottom panel 1 extends towards the support fold 11. In the collapsed position, the outer support panels 12, on the side remote from the bottom panel 1, are folded back relative to the respective inner support panels 10. A portion of each of the outer support panels is disposed between one of the connection panels 5 and one of the wall elements 3 of the first pair of wall elements. In the set-up position of the tray, the outer support panels 12 each extend substantially transverse of the corresponding inner support panels 10.

During the setting up of the tray, while the wall elements 3 and 4 are being swung from the bottom panel 1, the free edge 13 of each of the outer support panels 12 is held in the corresponding wall/connection fold 6 and urged inwards relative to the wall elements 4 of the second pair of wall elements by swinging out said wall elements 4 relative to said fold. Because in the collapsed position each of the outer support panels 12 is disposed between the connection panel 5 and a wall element 3 of the first pair of wall elements 3, a panel 12 is reliably urged inwards during setting up and the free edge 13 cannot move away from the wall element 3. The portions 15 of the free edge 13 of the outer support panel 12 that extend towards the support folds 11 at a distance from the bottom panel 1 ensure that the outer support panels 12 are gradually urged inwards during the setting up of the tray, while swinging the wall elements 4 of the second pair of wall elements off the bottom panel 1, on the inside of those wall elements 4, room is created for the outer support panels 12.

In order to set up the tray according to the invention, only one pair of the wall elements 3 or 4 needs to be swung up from the bottom panel 1. While the other pair of wall elements 4 or 3 are following automatically, the support elements 8 are automatically urged into the position contemplated.

The wall elements 4 of the second pair of wall elements may be single constructions. In the embodiment shown, however, these wall elements 4 each consist of an inner wall panel 16 and an outer wall panel 17 adjacent to said inner wall panel 16 along a wall fold 18. In the set-up position of the

tray, the wall fold 18 forms at least a part of the upper edge of the respective wall element 4 and the outer wall panels form inner walls of the tray. Thus a wall element of comparatively high rigidity is provided.

The inner support panels 10 are each of a height throughout the width between the wall/support fold and the support fold, that is substantially equal to the distance from the wall fold to the bottom/wall fold. Thus, when the tray is in the set-up position,

Further, in the embodiment shown, in the collapsed position the outer support panels 12 are each folded about a portion of the corresponding inner wall panel 16, so that this inner wall panel 16, for the purpose of providing further stiffening in the corner portion of the tray, may extend into the vicinity of the wall element 3 of the first pair of wall elements without the outer support panel 12 being prevented from being partly enclosed between the connection panel 5 and a wall element 3 of the first pair of wall elements. In the set-up position, the inner wall panel 16 extending up to a wall element 3 of the first pair of wall elements may further prevent a situation where the outer support panel 12 as a result of any pre-tension on the support fold 11, possibly in combination with a load exerted by any contents provided in the tray, may swing off that wall element 3 and fold back, ending up disposed against a wall element 4 of the second pair of wall elements. With an outer support panel 12 in the folded-back position referred to, the stability of the support element 8 is considerably smaller than when that support panel 12 extends substantially transverse of the adjacent inner support panel 10.

For further improving the introduction of forces into the support elements 8, particularly the transmission of forces by a support element 8 from a superjacent ready-to-use tray to a subjacent support element 8 of a subjacent ready-to-use tray, the ready-to-use tray according to the embodiment shown is provided with a pair of flaps 19, each of the flaps 19 being adjacent to a wall element 3 of the first pair of wall elements along a wall/flap fold 20. In the set-up position, each of the flaps 19 covers at least in part the top ends of a pair of support elements 8 opposite the bottom panel 1. Thus, the flaps 19 form support surfaces for a similar tray to be stacked on the present tray, so that a superjacent support element that is not accurately aligned with the support element of the present ready-to-use tray is less likely to lead to sagging of the bottom of the superjacent tray. Consequently, this reduces the risk that a superjacent support element slides off along a bottom portion that is inclining due to sagging. Moreover, the flaps 19 visually screen the top ends of the support elements 8 from the user.

Each of the flaps 19 is provided with a pair of flap-connection panels 21 each adjacent to an intermediate flap/connection fold 22 disposed substantially in the plane of one of the wall/connection folds 6. The flaps 19 are each provided with a central panel 23 and intermediate panels 25 adjacent thereto on opposite sides along an oblique intermediate fold 24, the intermediate panels 25 being adjacent to the flap-connection panels 21 along the intermediate flap/connection folds 22. Each of the flap-connection panels 21 is bonded to the inner surface of one of the connection panels 5 while the produced part of each of the intermediate folds 24 substantially extends through the point of intersection of the produced part of the wall/flap fold 20 and the corresponding wall/connection fold 6. Thus, in collapsed position each of the central flap panels 23 are coextensive with the corresponding wall element 3 of the first pair of wall elements, which is advantageous with a view to limiting the thickness of the collapsed tray, and the flaps 19 automatically assume a position transverse of the wall elements 3 and 4 when the tray is being set up.

Owing to the fact that in the tray according to the present embodiment the ends of the wall/flap fold 20 each abut a boundary of a portion of the adjacent wall element 3 extending from the bottom panel 1 beyond the wall/flap fold 20, said wall element forms an upright edge when the tray has been set up, this edge preventing a similar tray stacked on the present tray from sliding in the longitudinal direction of the second pair of wall elements 4.

According to the embodiment shown, a similar tray stacked on the present one is prevented from sliding in the longitudinal direction of the first pair of wall elements 3 in virtue of the fact that the connection panels 5 adjacent to the respective wall element 3 each have a portion that extends substantially the same distance from the bottom panel 1 as said portion of said wall element 3 does.

In the embodiment shown, the distance between the flap/connection folds 22 of each of the flaps 19 is greater than the distance between the wall/connection folds 6 which bound the adjacent wall element 3. As a result, when the tray has been set up, the central panels 23 of the flaps 19 extend from the wall elements 3 of the tray, obliquely from the bottom panel 1, so that the free edges of the central panels 23 are spaced further away from the bottom panel 1 than the edges remote from the bottom panel 1 of the corresponding wall elements 3 and of the connection panels 5. The intermediate panels 25 each extend obliquely from one of the central panels 23 to the corresponding flap-connection panel 21, with the intermediate flap/connection fold 22 extending parallel to the bottom panel 1 at

the location of the top ends remote from the bottom panel 1 of the support elements 8. When on the present tray a similar tray of a certain mass is placed, the central panels 23 are pressed in the direction of the bottom panel 1, whereby the obliquely-extending intermediate panels 25 exert an outward pressure on the connection panels 5. As a result, the edges remote from the bottom panel 1 of the connection panels 5 are moved away from each other, so that the bottom panel 1 of said similar tray that is placed on the present tray can rest against the flaps 19 between those upright edges.

The angle α between the set-up fold 7 and the wall/connection fold 6 bounding each of the connection panels 5 is greater than 45° . Consequently, the distance between the oppositely disposed wall elements 3 of the first pair of wall elements increases with the distance to the bottom panel 1, so that the length of bottom panel 1 in longitudinal direction is smaller than the distance between the oppositely disposed upright edges of the first pair of wall elements, and the bottom panel of a similar tray can be arranged between said upright edges.

Further, the bottom/wall folds 2 adjacent to the wall elements 4 of the second pair of wall elements each terminate at a distance from a wall element 3 of the first pair of wall elements. A free edge 26 of the bottom panel 1 extends in an area between each end of the bottom/wall folds 2 and the wall element 3 of the first pair of wall elements on the side of said end, with oppositely disposed free edges 26 extending towards each other along at least a part of their length, in the direction of said wall element 3. At each corner of the bottom panel 1, corresponding corner areas of connection panels 5 and of wall elements 3 and 4 are each provided with a common recess.

As a result, in the area of each of the wall elements 3 of the first pair of wall elements the tray has a reduced width, which is adapted to the width between the upright edges of the connection panels 5 in that area, which can be moved apart only to a limited extent, if at all, because they are connected there to the upright edges of the wall elements 3 of the first pair of wall elements, which edges extend transverse thereof.

The free edges 26 are defined by incisions between the wall elements 4 of the second pair of wall elements and the bottom panel. When wall elements 4 are single elements, these incisions provide the possibility of folding a portion of said wall element inwards as a support element. In a double-walled construction of the wall elements 4, the possibility is provided of arranging for the outer wall panels 17 to extend to the bottom panel 1 in the set-up position, with those outer wall panels 17 in the collapsed position each being disposed be-

tween an inner wall panel 16 and the bottom panel 1, without the outer adjacent wall panel 17 abutting the bottom/wall fold 2.

The oppositely disposed free edges 26 of the bottom panel 1 have oppositely disposed portions with a distance between them that is greater than the mutual distance between the bottom/wall folds 2 adjacent to the wall elements 4 of the second pair of wall elements by approximately one thickness of the wall of the sheet material. As a result, the edges of the wall elements 4 of the second pair of wall elements on the side of the bottom panel 1 do not extend beyond the bottom panel 1, so that when the tray is disposed on a similar tray after the bottom panel 1 has been led along the upright edges, the tray will not abut against the upright edge once more, via an edge.

The blank according to Figure 6 is provided with subpanels 101 and 102 to be folded against each other about a folding line 18 to form a double-walled support panel 10. Prior to folding the subpanels 101 and 102 against each other, at least one of the surfaces thereof to be folded against each other is provided with an adhesive layer, so that the subpanels 101 and 102 are also adhered to each other when they are folded against each other. As shown in Fig. 8, the mutually adhered subpanels 101 and 102 provide a doubling of the thickness and hence a further improvement of the bending stiffness of the inner support panel 10.

Each inner support panel 10 comprises a subpanel 102 that is adjacent to the corresponding outer wall panel 17 along an outer wall/support fold portion 92 and comprises another subpanel 101 that is adjacent to the corresponding inner wall panel 16 along an inner wall/support fold portion 91. The subpanel 102 adjacent to the outer wall panel 17 is further adjacent to said subpanel 101 adjacent to the inner wall panel 16 along the wall fold 18. In the finished ready-to-use tray, the subpanel 102 adjacent to outer wall panel 17 is folded about the wall fold 18 against the subpanel 101 adjacent to the inner wall panel 16.

By virtue of the fact that the subpanels 101 and 102 are mutually adjacent along the wall fold 18 and can be folded against each other, such folding can be done in one operation along with the folding of the outer wall panel 17. Further, the blank can be cut from a rectangular sheet of material of a similar size as a blank for a tray of similar size according to the embodiment discussed hereinabove (Fig. 5). The inner wall/support fold portion 91 along which the subpanel 101 adjacent to an inner wall panel 16 is connected to said wall panel enables this subpanel 101 to readily hinge along with the subpanel 102 when the ready-to-use tray is being set up. The inner wall/support fold portion 91 and the outer wall/support fold portion

92 together form the wall/support fold 9.

The blank according to Fig. 7 further comprises an outer subpanel 103 for each inner support panel 10 and an outer subpanel 122 for each outer support panel 12. These outer subpanels 103 and 122 can be folded about a support panel fold 130 against, respectively, a corresponding subpanel 102 of the inner support panel 10, adjacent to the outer wall panel and a corresponding inner subpanel 121 of the outer support panel 12. The subpanels 121 and 122 of the outer support panel 12 are mutually adjacent along that support panel fold 130.

When a blank according to this embodiment is being folded to form a collapsed ready-to-use tray - Fig. 9 shows a part thereof - the outer subpanels 103 and 122 are folded over about a subpanel fold 130 against, respectively, a corresponding subpanel 102 of the inner support panel 10, adjacent to the outer wall panel 17 and a corresponding inner subpanel 121 of the outer support panel 12. At least one of the surfaces to be mutually joined of the outer subpanel 103 and the subpanel 102 of the inner support panel 10, adjacent to the outer wall panel 17, is provided with an adhesive prior to folding those subpanels 102 and 103 against each other, so that these subpanels 102 and 103 are also mutually adhered when being folded against each other.

Preferably, first the last-mentioned subpanels 102 and 103 are folded against each other and mutually adhered and then they are jointly folded against the subpanel 101 of the inner support panel 10, adjacent to the inner wall panel 16. By providing this last-mentioned support panel 101 with an adhesive layer prior to folding, the subpanels 102 and 103 of the inner support panel 10 to be folded over along with the outer wall panel 17 can during folding be bonded with the support panel 101, which is adjacent to the inner wall panel 16, without interrupting the folding for applying an adhesive.

After said subpanels 101, 102 and 103 have been folded over and mutually adhered, the support panel fold 130 forms a portion of the free edge 13 of the outer support panel and the outer subpanel 103 of the inner support panel 10 is disposed between the subpanel 102 adjacent to the outer wall panel 17 and the subpanel 101 adjacent to the inner wall panel 16.

The additional outer subpanel 103 forms a further thickening of the inner support panel 10, which further improves the bending stiffness of the support 8. This embodiment with a further stiffened support, too, can be formed from a single blank, which blank can be cut from a rectangular piece of material of a similar size as a blank for a tray of similar size according to one of the embodiments

described hereinabove. For that matter, the blank according to Fig. 7 may also be formed without the subpanels 101 adjacent to the inner wall panels 16. In that case, inner support panels 10 are obtained having in principle the same thickness as the inner support panels 10 of the embodiment according to Fig. 6, in which case the inner wall panels 16 extending straight up to the wall elements 3 even after setting up provide some additional strength.

In the blank the support fold 11 comprises folds 111 and 112, uniformly spaced from the support panel fold 130 and parallel therewith. Disposed in the produced parts of these folds are recesses 114 and 113, respectively, with the folds 111 and 112 being disposed in the longitudinal direction within the reach of the oppositely disposed recesses 114 and 113, respectively.

After folding over the outer subpanels 122 and 103, the folds 111 and 112 of the support fold 11 are disposed opposite each other's produced part, where the recesses 113 and 114 are provided. This makes it possible that when the tray is being formed, which entails the outer support panels 12 being folded over relative to the corresponding inner support panels 10, the fold 112 adjacent to the outer subpanels 103 and 122 moves into the recess 113 in the produced part of the other fold 111 of the support fold 11. The other fold 111 at the same time moves into the recess 114 in the produced part of the fold 112 adjacent to the outer subpanels 103 and 122. The fact that the folds can move into each other's produced part improves the flexibility of the support fold 11 and facilitates both the manufacture and the setting up of the ready-to-use tray.

The support elements can further be reinforced by providing them with at least two support folds between the inner support panel and the outer support panel, between which support folds an intermediate panel extends in such a way that the cross-section of the support element approximates the form of a sector of circle.

In the embodiments according to Figs. 6 and 7, too, all panels and elements to be folded should be folded over from the outside in the direction of the bottom panel 1 and all on the same side of the bottom panel towards that bottom panel, so that this embodiment of the ready-to-use tray, too, can be manufactured by means of conventional box-folding machine.

Claims

1. A ready-to-use tray that can be or has been set up from a collapsed position, comprising a bottom panel (1), a first and a second pair of oppositely disposed wall elements (3 and 4, respectively) adjacent to said bottom panel (1)

along bottom/wall folds (2), two pairs of connection panels (5) which are each adjacent to a wall element (3) of said first pair of wall elements along a wall/connection fold (6), hingedly connected to a wall element (4) of said second pair of wall elements along a set-up fold (7), the wall/connection fold (6) extending transverse of the bottom/wall fold (2) adjacent to the respective wall element (3), the set-up fold (7) extending obliquely relative to said folds and the produced part of each of the set-up folds (7) substantially intersecting a most proximal point of intersection of said bottom/wall folds (2), and two pairs of support elements (8) each adjacent to a wall element (4) of said second pair of wall elements along a wall/support fold (9), the wall/support fold (9) extending transverse of the bottom/wall fold (2) adjacent to the respective wall element (4), each support element (8) comprising an inner support panel (10) adjacent to the wall element, a support fold (11) adjacent to said inner support panel (10) and an outer support panel (12) adjacent to a support fold (11), the outer support panels (12) each having a free edge (13) opposite the support fold (11), which edge extends towards the support fold (11) at a distance from the bottom panel (1), the outer support panels (12) in the collapsed position, on the side remote from the bottom panel (1) being folded back relative to the inner support panels (10) of a corresponding support element (8), a portion of the outer support panel (12) being disposed between the connection panel (5) and a wall element (3) of the first pair of wall elements, and the outer support panels (12), in the set-up position, each extending substantially transverse of the inner support panel (10) of a corresponding support element (8), characterized in that the bottom/wall folds (2) adjacent to the wall elements (4) of the second pair of wall elements each terminate at a distance from a wall element (3) of the first pair of wall elements, that is greater than the distance from the most proximal wall/support fold (9) to said wall element (3), that a free edge (26) of the bottom panel (1) extends in an area between each end of the bottom/wall folds (2) and the wall element (3) of the first pair of wall elements on the side of that end, and that, in set-up position, the support panels (8) each bear on the bottom panel (1) substantially over the entire distance between the wall/support fold (9) and the support fold (11) of said support panels (8).

2. A ready-to-use tray according to claim 1, characterized in that the wall elements (4) of the

second pair of wall elements each consist of an inner wall panel (16) and an outer wall panel (17) adjacent to the inner wall panel (16) along a wall fold (18), the wall folds (18), when the tray is in the set-up position, each forming at least a part of the upper edge of the respective wall element (4) and the outer wall panels (12) forming inner walls of the tray and the inner support panels (10) each having a height substantially throughout the width between the wall/support fold (9) and the support fold (11), that is substantially equal to the distance from the wall fold (18) to the bottom/wall fold (2).

3. A ready-to-use tray according to claim 2, characterized in that each inner support panel (10) comprises mutually adhered subpanels (101 and 102, 103) folded against each other.
4. A ready-to-use tray according to claim 3, characterized in that of each inner support panel (10) a subpanel (102) is adjacent to the corresponding outer wall panel (17) along an outer wall/support fold portion (92) and another subpanel (101) is adjacent to the corresponding inner wall panel (16) along an inner wall/support fold portion (91), the subpanel (102) adjacent to the outer wall panel (17) being folded against the subpanel (101) adjacent to the inner wall panel (16) about the wall fold (18).
5. A ready-to-use tray according to claim 3, characterized in that each inner support panel (10) has an outer subpanel (103) and each outer support panel (12) has an outer subpanel (122), which outer subpanels (103 and 122) are folded about a support panel fold (130) against, respectively, a corresponding subpanel (102) of the inner support panel (10), adjacent to the outer wall panel, and a corresponding inner subpanel (121) of the outer support panel (12), the support panel fold (130) forming a portion of the free edge (13) of the outer support panel (10).
6. A ready-to-use tray according to claim 5, characterized in that the support fold 11 comprises substantially co-extensive folds (111 and 112), a first of said folds (111) being adjacent to the inner subpanel (121) of the outer support panel (12) and a second of said folds (112) being adjacent to the outer subpanel (122) of the outer support panel (12), the folds (111 and 112) being disposed at least partly in recesses (114 and 113, respectively) in each other's produced part between each of the subpanels (122 and 121, respectively) of the outer sup-

port panel (12) and a subpanel (103 and 102, respectively) adjacent thereto.

7. A ready-to-use tray according to claims 4 and 5, characterized in that the outer subpanel (103) of each inner support panel (10) is disposed between the corresponding subpanel (102) adjacent to the outer wall panel (17) and the corresponding subpanel (101) adjacent to the inner wall panel (16) and is adhered to said two subpanels (101 and 102).
8. A ready-to-use tray according to claim 1, characterized in that each support element comprises at least two support folds between the inner support panel and the outer support panel, between which support folds an intermediate panel extends in such a way that the cross-section of the support element approximates the form of a sector of circle.
9. A ready-to-use tray according to any one of the preceding claims, wherein a flap is adjacent to each of the wall elements of the first pair along a wall/flap fold, characterized in that in the set-up position the flaps (19) each cover at least partly the top ends of a pair of support elements (8) opposite the bottom panel (1).
10. A ready-to-use tray according to claim 9, characterized in that each of the flaps (19) is provided with a pair of flap-connection panels (21) each adjacent to a fold disposed substantially in the plane of one of the wall/connection folds, the flaps (19) are each provided with a central panel (23) and intermediate panels (25) adjacent thereto on opposite sides along an oblique intermediate fold (24), the flap-connection panels (21) being adjacent to said intermediate panels (25) along intermediate flap/connection folds (22), each of the flap-connection panels (21) being bonded to the inner surface of one of the connection panels (21), the produced part of each of the intermediate folds (25) substantially extending through the point of intersection of the produced part of the wall/flap fold (20) and the corresponding wall/connection fold (6).
11. A ready-to-use tray according to claim 9 or 10, characterized in that the ends of the wall/flap folds (20) each are adjacent to a boundary of a portion of the corresponding wall element (3) extending from the bottom panel (1) beyond the wall/flap fold (20).
12. A ready-to-use tray according to claim 11, characterized in that the connection panels (5)

each comprise a portion which extends substantially the same distance from the bottom panel (1) as said portions of said wall element (3) extending beyond the wall/flap fold (20).

13. A ready-to-use tray according to claim 12, characterized in that the distance between the flap/connection folds (22) of each of the flaps (19) is greater than the distance between the wall/connection folds (6) bounding the wall elements adjacent thereto.
14. A ready-to-use tray according to claim 12 or 13, characterized in that the angle (a) between the set-up fold and the wall/connection fold (7) bounding the connection panels (5) is greater than 45°.
15. A ready-to-use tray according to any one of the preceding claims, characterized in that the oppositely disposed free edges (26) of the bottom panel (1) comprise oppositely disposed portions with a distance between them that is greater than the mutual distance between the bottom/wall folds (2) adjacent to the wall elements (4) of the second pair of wall elements, by approximately one thickness of the wall of the sheet material.
16. A blank formed from at least one sheet, for forming a ready-to-use tray according to any one of the preceding claims, comprising a bottom panel (1), a first and a second pair of oppositely disposed wall elements (3 and 4, respectively) adjacent to said bottom panel (1) along bottom/wall folds (2), two pairs of connection panels (5) each adjacent to a set-up fold (7), wall/connection folds (2) extending transverse of the bottom/wall folds (2) adjacent to the respective wall element (3), the set-up folds (7) extending obliquely relative to said folds (2 and 6) and two pairs of support elements (8) each adjacent to a wall element (4) of said second pair of wall elements along a wall/support fold (9), the wall/support fold (9) extending transverse of the bottom/wall fold (2) adjacent to the respective wall element (4), each support element (8) comprising an inner support panel (10) adjacent to the wall element (4) and an outer support panel (12) adjacent to said inner support panel along a support fold (11), the outer support panels (12) having free edges (13) opposite the support fold (11), at least a terminal portion of said edges extending towards the support fold (11), characterized in that the bottom/wall folds (2) adjacent to the wall elements (4) of the second pair of wall elements each terminate at a distance from a

wall element (3) of the first pair of wall elements, that is greater than the distance from the most proximal wall/support fold (9) to said wall element (3) or to a produced part of the bottom/wall fold (2) adjacent to said wall element (3), and that a free edge (26) of the bottom panel (1) extends in an area between each end of the bottom/wall folds (2) and the wall element (3) of the first pair of wall elements on the side of that end.

5

10

17. A blank according to claim 16, characterized in that each inner support panel (10) comprises at least two subpanels (101 and 102, 103) to be folded against each other about a folding line (18, 130).

15

18. A blank according to claim 17, characterized in that of each of the inner support panels (10) a subpanel (102) is adjacent to the corresponding outer wall panel (17) along an outer wall/support fold portion (92) and another subpanel (101) is adjacent to the corresponding inner wall panel (16) along an inner wall/support fold portion (91), the subpanel (102) adjacent to the outer wall panel (17) being adjacent along the wall fold (18) to the subpanel (101) adjacent to the inner wall panel (16).

20

25

30

19. A blank according to claim 17, characterized in that each inner support panel (10) comprises an outer subpanel (103) and each outer support panel (12) comprises an outer subpanel (122), which subpanels (103 and 122) can be folded about a support panel fold (130) against, respectively, a corresponding subpanel (102) of the inner support panel (10), adjacent to the outer wall panel, and a corresponding inner subpanel (121) of the outer support panel (12), the subpanels (121 and 122) of the outer support panel (12) being mutually adjacent along the support panel fold (130).

35

40

20. A blank according to claim 19, characterized in that the support fold (11) comprises folds (111 and 112) uniformly spaced from the support panel fold (130) and parallel thereto, recesses (114 and 113, respectively) being disposed in the produced parts of said folds, the folds (111 and 112) being disposed in the longitudinal direction within the reach of the oppositely disposed recesses (114 and 113, respectively).

45

50

55

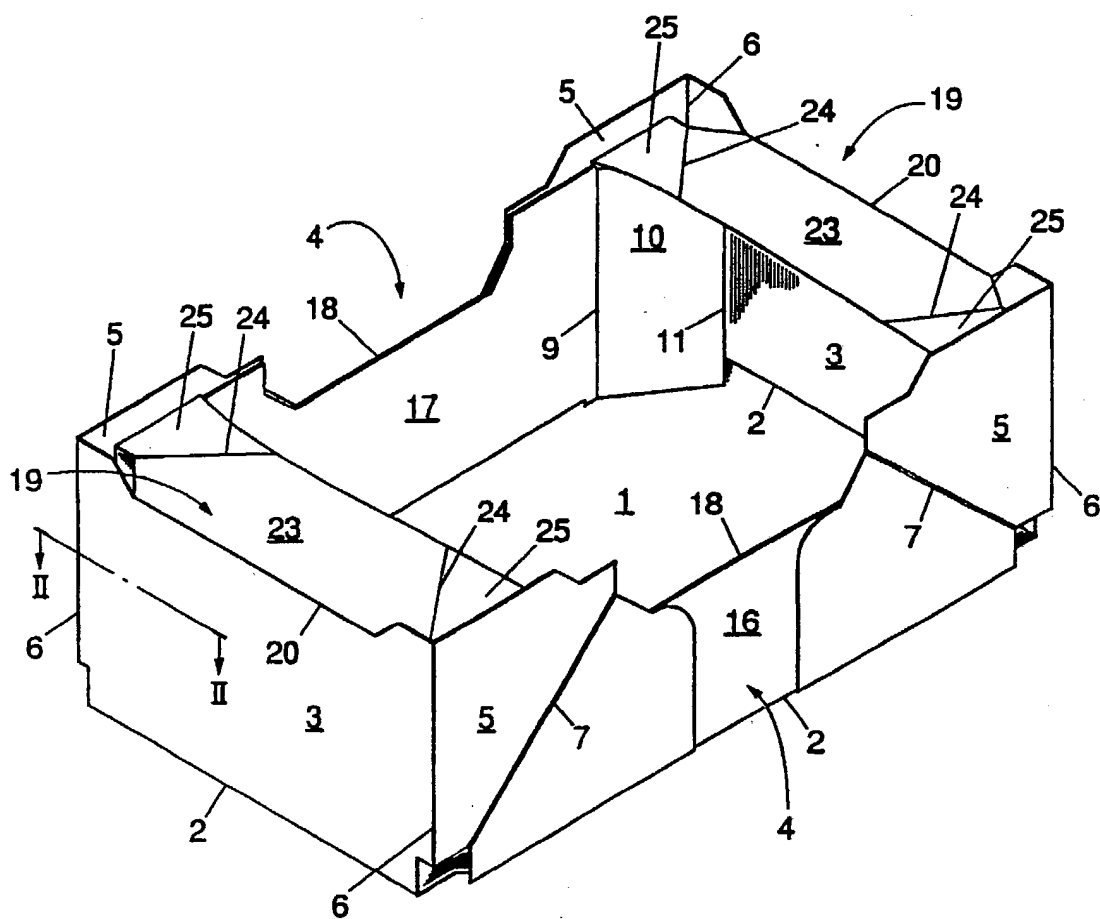


FIG. 1

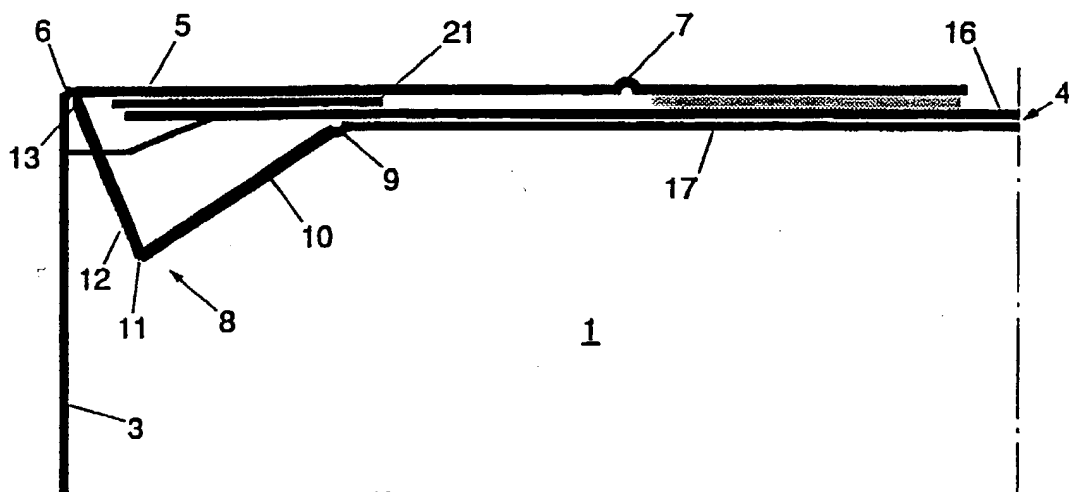


FIG. 2



FIG. 3

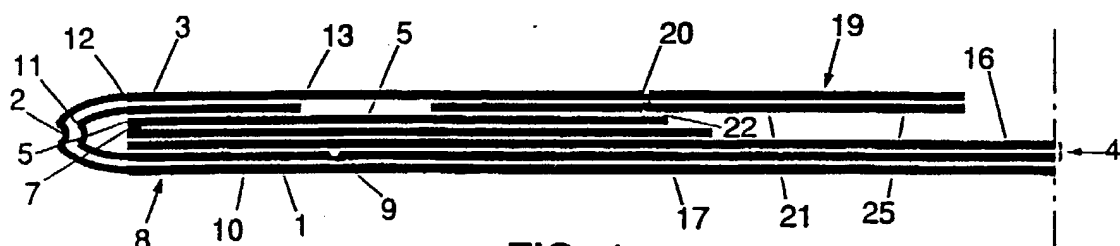


FIG. 4

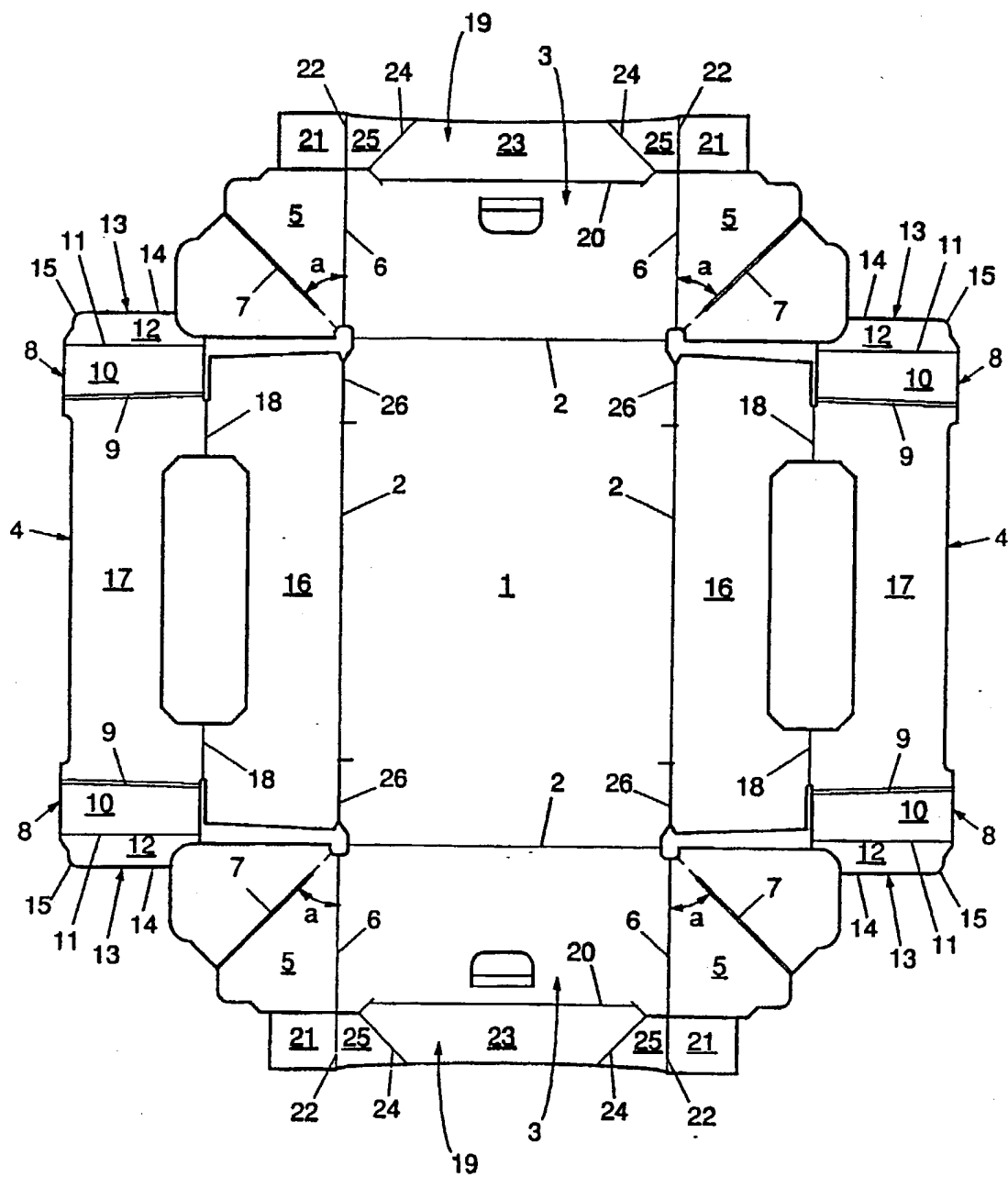


FIG. 5

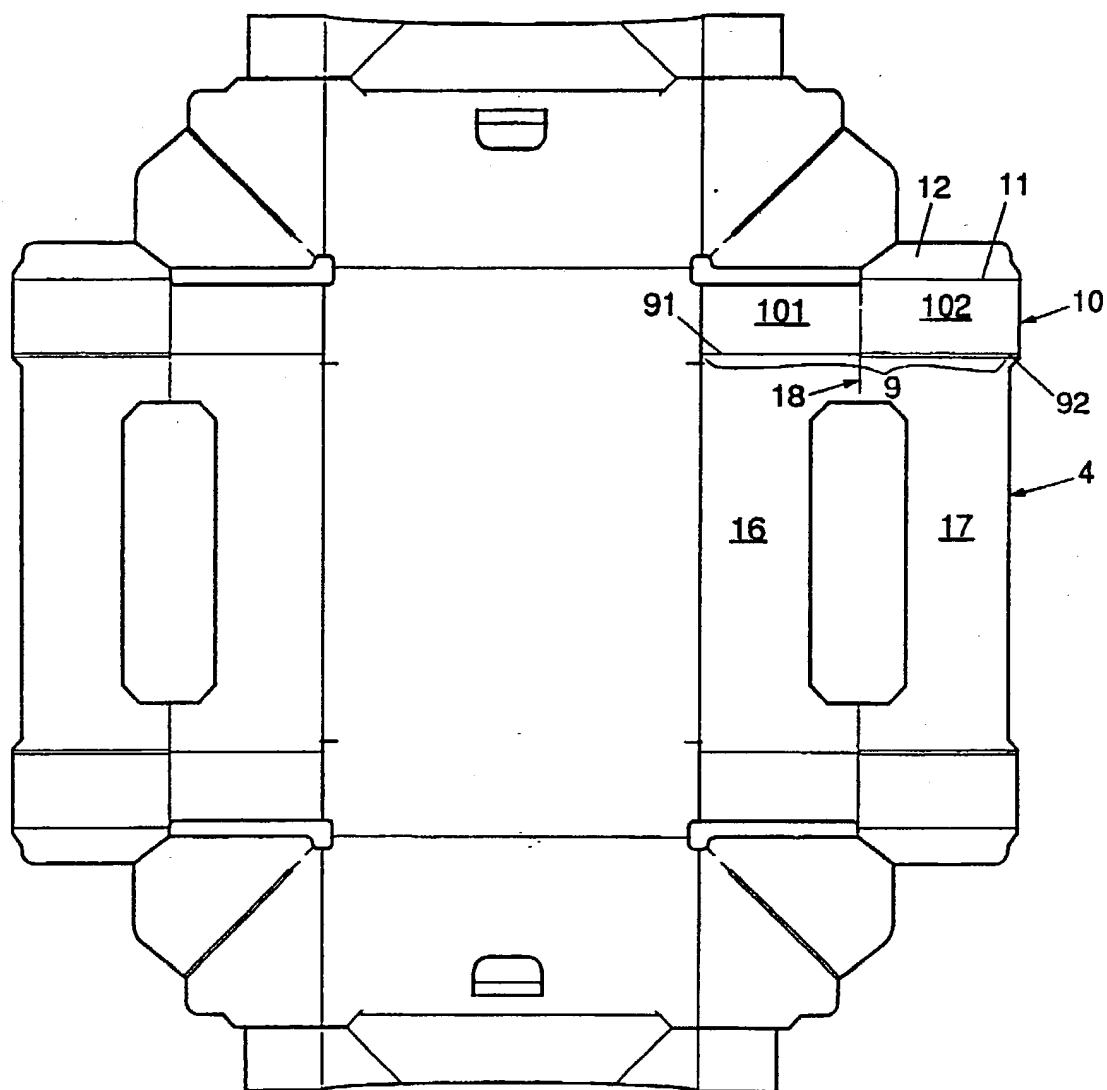


FIG. 6

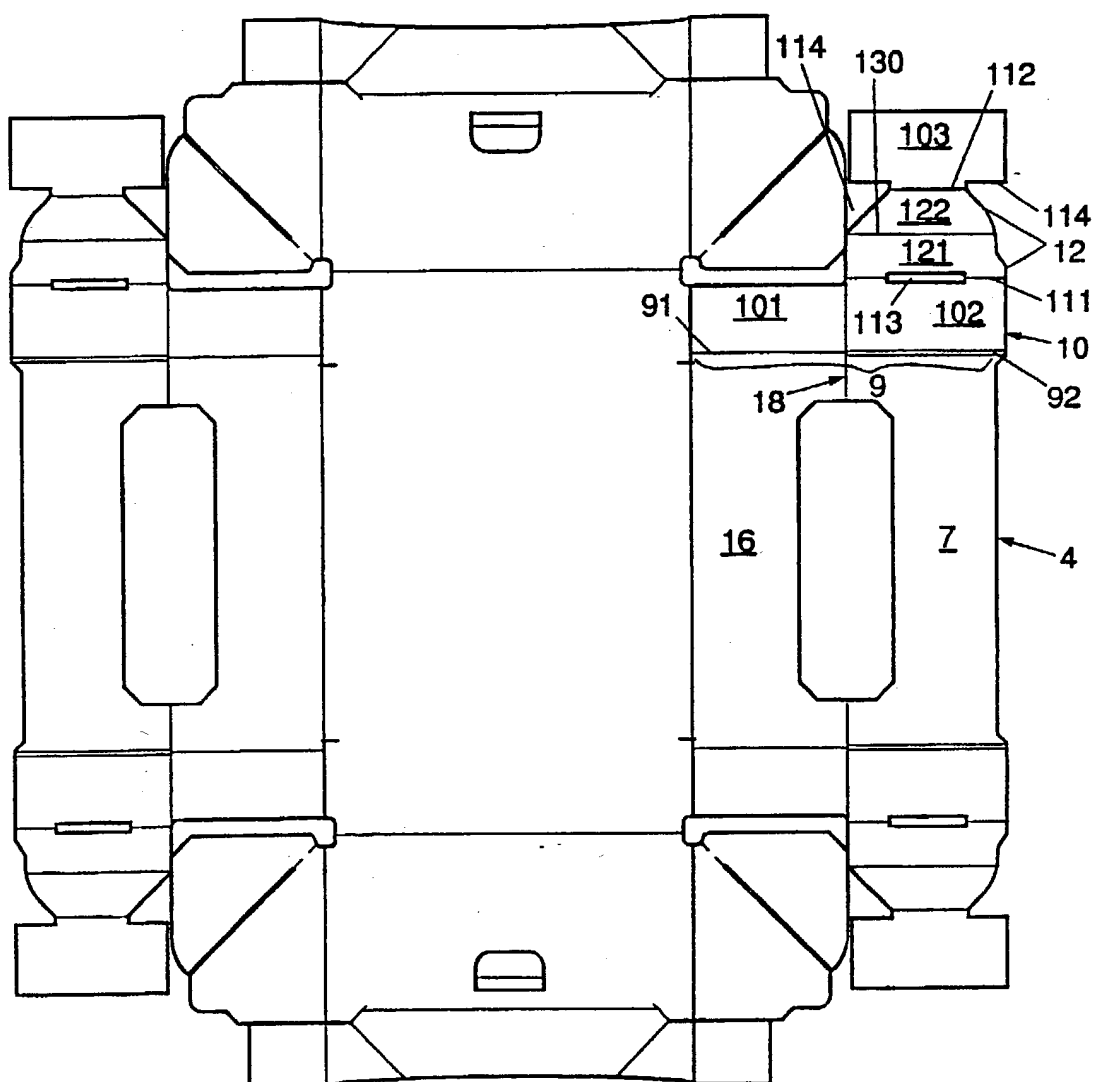


FIG. 7

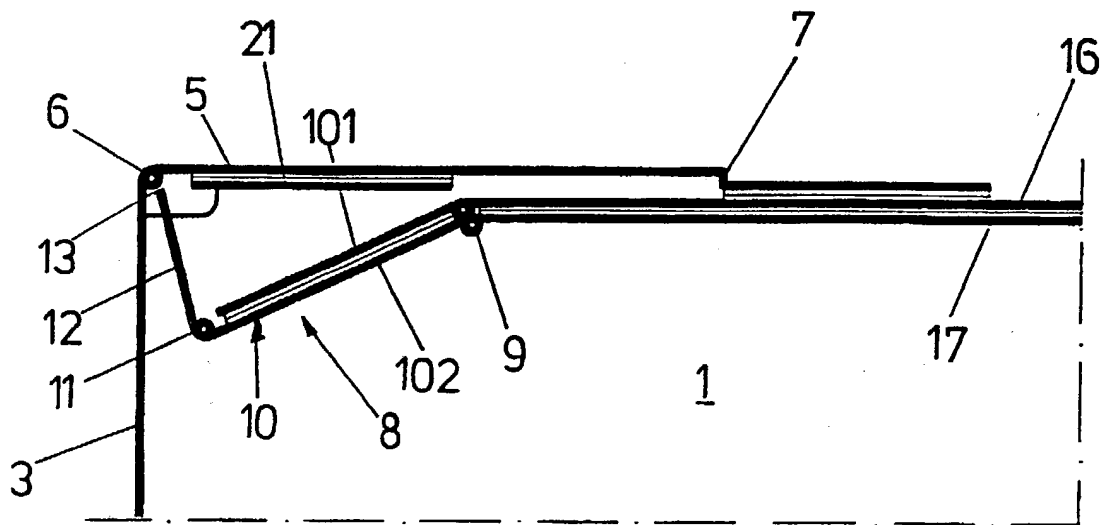


FIG. 8

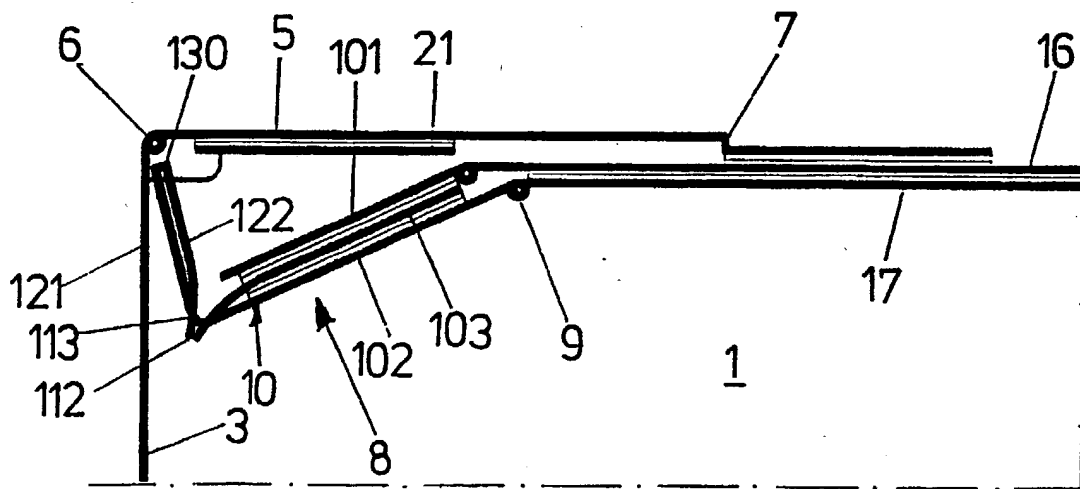


FIG. 9



European
Patent Office

EUROPEAN SEARCH REPORT

Application Number

EP 90 20 3521

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
Y,D	DE-U-8 610 403 (HERZBERGER PAPIERFABRIK) * Page 4, line 7 - page 5, line 28; figures 1,2 * - - - -	1,16	B 65 D 5/00 B 65 D 5/36
Y	FR-A-2 259 755 (PAPETERIES L. CLERGEAU) * Page 5, lines 21-31; figures 4-7 * - - - -	1,16	
A	GB-A-2 201 663 (BOIX MAQUINARIA) * Figure 1 * - - - -	1	
A	EP-A-0 076 883 (H.KILLIAN LTD) - - - - -		
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (Int. Cl.5)
			B 65 D
Place of search		Date of completion of search	Examiner
The Hague		27 May 91	BERRINGTON N.M.
CATEGORY OF CITED DOCUMENTS			
X: particularly relevant if taken alone			
Y: particularly relevant if combined with another document of the same category			
A: technological background			
O: non-written disclosure			
P: intermediate document			
T: theory or principle underlying the invention			
E: earlier patent document, but published on, or after the filing date			
D: document cited in the application			
L: document cited for other reasons			
&: member of the same patent family, corresponding document			